

What is claimed is:

1. A magneto-optical disk having a recording
layer made of a magnetic film having magnetic anisotropy
in a vertical direction to a film surface of a substrate
5 on the substrate,

wherein said recording layer comprises:

a main recording region for recording first
information,

a sub recording region formed on an inner
10 circumference side from said main recording region and
recording second information including disk
discrimination information, and

a buffer region formed between said main
recording region and said sub recording region and
15 recording third information,

wherein said second information is recorded
in a form of a mark array formed in stripe shapes in said
sub recording region and said buffer region, a plurality
of marks constituting said mark array being parts changed
20 in magnetization state of said recording layer, and

wherein said third information can be
reproduced by a modulation signal of a reflection ratio
along a circumferential direction of the magneto-optical
disk.

25 2. A magneto-optical disk as set forth in claim

1, wherein each said mark is formed by irreversible elimination or degradation of the magnetism of said recording layer.

3. A magneto-optical disk as set forth in claim 1, wherein each said mark is formed by inverting the magnetization of said recording layer.

4. A magneto-optical disk as set forth in claim 1, wherein said mark array is formed meandering along the circumferential direction of the disk and a size of said buffer region in the disk radial direction has at least the amplitude of said meandering.

5. A magneto-optical disk as set forth in claim 4, wherein:

each said mark comprises a plurality of mark elements formed connected in at least a radial direction of said magneto-optical disk,

said mark array comprises a plurality of mark element arrays formed substantially concentrically, and

said mark element arrays comprise pluralities of mark elements formed along a circumferential direction of said magneto-optical disk.

6. A magneto-optical disk as set forth in claim 5, wherein:

each said mark element is formed by focusing pulse light having a predetermined beam shape,

each said mark element array is formed by
focusing said pulse light at a predetermined position
while rotating said magneto-optical disk,

said mark element arrays are formed by
5 focusing said pulse light at different positions from
each other, and

an amplitude of meandering includes an offset
of an actual center of rotation of said magneto-optical
disk and an ideal center axis of said magneto-optical
10 disk.

7. A magneto-optical disk as set forth in claim
6, wherein said meandering is caused by at least
eccentricity of said magneto-optical disk.

8. A magneto-optical disk as set forth in claim
15 6, wherein said meandering is caused by at least wobbling
of a shaft for rotating said magneto-optical disk.

9. A magneto-optical disk as set forth in claim
1, wherein said third information includes control data
indicating physical attributes of said magneto-optical
20 disk.

10. A magneto-optical disk as set forth in claim
1, wherein said third information is recorded by pits.

11. A magneto-optical disk as set forth in claim
1, wherein said third information is recorded by a
25 wobbling groove.

12. A magneto-optical disk as set forth in claim
1, wherein:

said first information is reproduced based on
rotation of a polarization direction of light striking
5 said main recording region, and

said second information is reproduced based
on rotation of a polarization direction of light striking
at least one of said sub recording region and said buffer
region.

10 13. A magneto-optical disk as set forth in claim
12, wherein:

at least said first information is reproduced
by heating part of said recording layer by focusing of
light,

15 said recording layer is a multiple layer film
comprised of at least a first magnetization layer, a
second magnetization layer, and a third magnetization
layer stacked together, and

among a Curie temperature T_{c1} of said first
20 magnetization layer, a Curie temperature T_{c2} of said
second magnetization layer, and a Curie temperature T_{c3}
of said third magnetization layer, a Curie temperature
 T_{c2} of said second magnetization layer is the lowest.

14. A magneto-optical disk as set forth in claim
25 1, wherein:

said sub recording region is formed to a radius of 14.5 to 15.7 mm, and

said buffer region is formed to a radius of 15.7 to 16.0 mm.

5 15. A method for recording, on a magneto-optical disk having a main recording region in which first information is recorded, second information including disk discrimination information and third information including physical attributes of said magneto-optical
10 disk, comprising:

a step of forming a track having a reflection ratio changing along a circumferential direction of said magneto-optical disk in a buffer region provided on an inner circumference side of said main recording region
15 and recording said third information and

a step of forming a stripe-shaped mark array in a sub recording region provided on the inner circumference side of said buffer region and recording said second information, wherein

20 said step of recording the second information includes:

a step of rotating said magneto-optical disk and focusing pulse light on said magneto-optical disk in a tracking servo OFF state and

25 a step of forming part of said meandering

mark array in said buffer region and recording said second information in said buffer region overlapped with said third information.

16. A method of recording of a magneto-optical disk as set forth in claim 15, wherein said step of forming said mark array includes a step of irreversibly eliminating or degrading magnetism in part of said recording layer.

17. A method of recording of a magneto-optical disk as set forth in claim 16, further comprising a step of irreversibly eliminating or degrading magnetism in part of said recording layer, then uniformly magnetizing the parts of said recording layer not irreversibly eliminated or degraded in magnetism.

18. A method of recording of a magneto-optical disk as set forth in claim 15, wherein said step of forming said mark array includes:

a step of uniformly magnetizing said recording layer and

a step of inverting the magnetization in part of the recording layer to magnetize it.

19. A method of recording of a magneto-optical disk as set forth in claim 15, further comprising the step of recording said first information in said main recording region in the state with tracking servo control

applied.

20. A method of recording of a magneto-optical disk as set forth in claim 15, wherein said step of recording said third information includes a step of forming pits at said buffer region.

21. A method of recording of a magneto-optical disk as set forth in claim 15, wherein said step of recording said third information includes a step of forming a wobbling groove at said buffer region.

22. A method of recording of a magneto-optical disk as set forth in claim 15, wherein said step of recording said second information is performed in a state with tracking servo control applied.

23. A method of reproduction of a magneto-optical disk having a recording layer comprised of at least a first magnetization layer, a second magnetization layer, and a third magnetization layer successively stacked from a light focusing side, formed with a main recording region and a sub recording region in said recording layer, and having a Curie temperature T_{c2} of said second magnetization layer lowest among a Curie temperature T_{c1} of said first magnetization layer, a Curie temperature T_{c2} of said second magnetization layer, and a Curie temperature T_{c3} of said third magnetization layer, comprising:

a step of reproducing first information recorded in said main recording region by focusing light having an intensity resulting in a temperature T_r of the recording layer becoming larger than T_{c2} and

5 a step of reproducing second information including disk discrimination information recorded in said sub recording region by focusing light having an intensity resulting in the temperature T_r of said recording layer becoming smaller than T_{c2} ,

10 said first information being reproduced by control based on said reproduced second information.

24. A method of reproduction from a magneto-optical disk as set forth in claim 23, wherein said step of reproducing first information includes a step of
15 heating part of said recording layer by focusing of light and detecting a rotation of the polarization direction of said light.

25. A method of reproduction from a magneto-optical disk as set forth in claim 23, wherein said step
20 of reproducing second information includes a step of detecting rotation of the polarization direction of said light.

26. A method of reproduction from a magneto-optical disk having a main recording region in which
25 first information is recorded and having recorded second

information including disk discrimination information of said magneto-optical disk and third information including physical attributes of said magneto-optical disk, comprising:

5 a step of reproducing said second information recorded by a stripe-shaped mark array formed at part of the buffer region provided on the inner circumference side of said main recording region and a sub recording region provided on the inner circumference side of said
10 buffer region in a tracking servo OFF state and

 a step of reproducing said third information recorded in said buffer region by a modulation signal of a reflection ratio along a circumferential direction of the disk.

15 27. A method of reproduction from a magneto-optical disk as set forth in claim 26, further comprising the step of control according to said reproduced second information to record or reproduce said first information in said main recording region.

20 28. A method of reproduction from a magneto-optical disk as set forth in claim 26, wherein said step of reproducing second information is performed with focus servo control applied.

 29. A method of reproduction from a magneto-
25 optical disk as set forth in claim 26, wherein said step

of reproducing third information includes a step of reproducing said third information recorded in said buffer region overlapped on said second information.

30. A method of reproduction from a magneto-optical disk as set forth in claim 26, wherein said step of reproducing second information includes a step of detecting rotation of a polarization direction of said light.

31. A method of reproduction from a magneto-optical disk as set forth in claim 27, wherein said step of reproducing first information includes a step of heating part of said recording layer by focusing of light and detecting a rotation of the polarization direction of said light.

32. A method of reproduction from a magneto-optical disk as set forth in claim 27, wherein said step of recording or reproducing the first information is carried out in a state with tracking servo control applied.

33. An apparatus for recording a data on a magneto-optical disk having a recording layer made of a magnetic film having magnetic anisotropy in a vertical direction to a film surface of a substrate on the substrate, wherein said recording layer has a main recording region for recording first information, a sub

recording region formed on an inner circumference side
from said main recording region and recording second
information including disk discrimination information,
and a buffer region formed between said main recording
5 region and said sub recording region and recording third
information; said second information is recorded in a
form of a mark array formed in stripe shapes in said sub
recording region and said buffer region, a plurality of
marks constituting said mark array being parts changed in
10 magnetization state of said recording layer; and said
third information can be reproduced by a modulation
signal of a reflection ratio along a circumferential
direction of the magneto-optical disk,

said second information including disk
15 discrimination information and third information
including physical attributes of said magneto-optical
disk, comprising:

a means for forming a track having a
reflection ratio changing along a circumferential
20 direction of the disk in a buffer region provided on an
inner circumference side of the main recording region and
recording the third information and

a means for forming a stripe-shaped mark
array in a sub recording region provided on the inner
25 circumference side of the buffer region and recording the

second information, wherein

the means for recording the second
information includes

a means for rotating the magneto-optical disk
5 and focusing pulse light on the magneto-optical disk in a
tracking servo OFF state and

a means for forming part of the meandering
mark array in the buffer region and recording the second
information in the buffer region overlapped with the
10 third information.

34. An apparatus for recording a data on a
magneto-optical disk as set forth in claim 33, wherein
said means for forming a mark array irreversibly
eliminates or degrades the magnetism at part of said
15 recording layer.

35. An apparatus for recording a data on a
magneto-optical disk as set forth in claim 34, wherein
said means for forming a mark array irreversibly
eliminates or degrades magnetism in part of said
20 recording layer, then uniformly magnetizes the parts of
said recording layer not irreversibly eliminated or
degraded in magnetism.

36. An apparatus for recording a data on a
magneto-optical disk as set forth in claim 33, wherein
25 said means for forming said mark array uniformly

magnetizes said recording layer and inverts the magnetization in part of the recording layer to magnetize it.

37. An apparatus for recording a data on a
5 magneto-optical disk as set forth in claim 33, further comprising a means for recording said first information in said main recording region in the state with tracking servo control applied.

38. An apparatus for recording a data on a
10 magneto-optical disk as set forth in claim 33, wherein said means for recording said third information forms pits at said buffer region.

39. An apparatus for recording a data on a
magneto-optical disk as set forth in claim 33, wherein
15 said means for recording said third information includes a step of forming a wobbling groove at said buffer region.

40. An apparatus for recording a data on a
magneto-optical disk as set forth in claim 33, wherein
said means for recording second information operates in a
20 state with tracking servo control applied.

41. An apparatus for reproducing a data from a
magneto-optical disk having a recording layer comprising
at least a first magnetization layer, a second
magnetization layer, and a third magnetization layer
25 successively stacked from a light focusing side, formed

with a main recording region and a sub recording region
in said recording layer, and having a Curie temperature
Tc2 of said second magnetization layer lowest among a
Curie temperature Tc1 of said first magnetization layer,
5 a Curie temperature Tc2 of said second magnetization
layer, and a Curie temperature Tc3 of said third
magnetization layer, comprising:

a means for reproducing first information
recorded in said main recording region by focusing light
10 having an intensity resulting in a temperature Tr of the
recording layer becoming larger than Tc2 and

a means for reproducing second information
including disk discrimination information recorded in
said sub recording region by focusing light having an
15 intensity resulting in the temperature Tr of said
recording layer becoming smaller than Tc2,

said first information being reproduced by
control based on said reproduced second information.

42. An apparatus for reproducing information from
20 a magneto-optical disk as set forth in claim 41, wherein
said means for reproducing first information heats part
of said recording layer by focusing of light and detects
a rotation of the polarization direction of said light.

43. An apparatus for reproducing information
25 from a magneto-optical disk as set forth in claim 41,

wherein said means for reproducing second information detects rotation of the polarization direction of said light.

44. An apparatus for reproducing of information
5 from a magneto-optical disk having a recording layer made of a magnetic film having magnetic anisotropy in a vertical direction to a film surface of a substrate on the substrate, wherein said recording layer has a main recording region for recording first information, a sub
10 recording region formed on an inner circumference side from said main recording region and recording second information including disk discrimination information, and a buffer region formed between said main recording region and said sub recording region and recording third
15 information; said second information is recorded in a form of a mark array formed in stripe shapes in said sub recording region and said buffer region, a plurality of marks constituting said mark array being parts changed in magnetization state of said recording layer; and said
20 third information can be reproduced by a modulation signal of a reflection ratio along a circumferential direction of the magneto-optical disk, comprising:

a means for reproducing said second
information recorded by a stripe-shaped matrix array
25 formed at part of said buffer region provided at the

inner circumference side of the main recording region and
said sub recording region provided at the inner
circumference side of said buffer region in a state with
no tracking servo control applied and

5 a means for reproducing said third
information recorded at said buffer region by a
modulation signal of a reflection ratio along the
circumferential direction of said magneto-optical disk.

45. An apparatus for reproduction of a magneto-
10 optical disk as set forth in claim 44, further comprising
a means for control according to said reproduced second
information to record or reproduce said first information
in said main recording region.

46. An apparatus for reproduction of a magneto-
15 optical disk as set forth in claim 44, wherein said means
for reproducing second information operates with focus
servo control applied.

47. An apparatus for reproducing information from
a magneto-optical disk as set forth in claim 44, wherein
20 said means for reproducing third information reproduces
said third information recorded in said buffer region
overlapped on said second information.

48. An apparatus for reproducing information from
a magneto-optical disk as set forth in claim 44, wherein
25 said means for reproducing second information detects

rotation of a polarization direction of said light.

49. An apparatus for reproducing information from a magneto-optical disk as set forth in claim 44, wherein said means for reproducing first information heats part
5 of said recording layer by focusing of light and detects a rotation of the polarization direction of said light.

50. An apparatus for reproducing information from of a magneto-optical disk as set forth in claim 44, wherein said means for recording or reproducing the first
10 information operates in a state with tracking servo control applied.